Chapter 8 Solids, Liquids, Gases

8.1 Matter and Temperature

I. States of Matter

A. Four states of matter: solid, liquid, gas, plasma

1. State of matter depends on its temperature

II Solids (particles tightly packed)

A. Every solid has a definite shape and definite volume (cm^3) ! cm x cm x cm

* B. Kinetic theory of matter – tiny particles in constant motion make up all matter

C. Crystalline solids - particles arranged in repeating geometric patterns; different solid have different crystal types

D. Non crystalline solids (examples: glass or plastic) to as amporhous (no form) solids

III Liquids (less tightly packed particles) - flows and it takes the shape of its container

A. Have definite volume, but shape of its container

Jan 13-2:03 PM

IV Gases (most energy and space between particles)

A. Gases has neither a definite shape nor definite volume

→ see Figure 8-6, p.217

V Plasma - a gaslike mixture of positively and negatively charged particles

A. Plasma has the most energy in particles of states of matter; most common matter in the universe

B. Thermal Expansion - almost all matter expands as it is heated and contracts when it gets older

Jan 14-10:40 AM

8.1 Review

Grade: 8th

Subject: Physical Science

Date: 1/14/13

Jan 13-2:05 PM

1 The four states of matter are:

A solid, liquid, gas, air
B air, solid, liquid, ice
C solid, liquid, plasma, air
D solid, liquid, gas, plasma

Jan 13-2:07 PM

2 Which state of matter has definite shape and definite volume?

solid

Jan 13-2:07 PM

3 According to the kinetic theory, all matter is composed of tiny particles in constant motion.

True

False

Jan 13-2:08 PM

4 What happens to most matter when it is heated?

A it shrinks
B it stays the same
C it expands
D it dissolves

Jan 13-2:09 PM

5 The average speed of particles of matter _____ as it is heated.

A increases
B decreases
C stays the same

Jan 13-2:09 PM

6 The density of a sample of water vapor is 0.0031 g/mL. The density of a second sample of liquid water is 1.0 g/mL. How many times more dense is the liquid than the vapor?

$\frac{0.0031\ g/mL \times ?}{.0031} = \frac{1.0\ g/mL}{.0031}$

$? = 322$

Jan 13-2:11 PM

8.2 Fresh Water - will there be enough?

I. Fresh Water

A. The most important liquid on Earth is H_2O, fresh H_2O

1. The average person uses about 200 gallons a day for daily functions

II Water Pollution

A. Polluted H_2O -- H_2O that contains high levels of unwanted materials that is unacceptable for drinking or everyday use

B. Thermal pollution - excess heat in the water system

1. Temperatures that are hot can have a serious impact on an organism's ability to survive

C. Six sources of H_2O pollution:

1. Animal/plant wastes, raw sewage, fertilizers, pesticides, herbicides, and/or household cleaners

Jan 15-10:26 AM

8.3 Changes in State

I. Identifying Changes in State

A. When you boil H_2O you observe a change of state called vaporization

1. However, many liquids do not need to boil in order to vaporize

B. During evaporization, a liquid changes to gas gradually at temperatures below boiling pt.

C. Ice cubes that are frozen for an extended period of time will shrink due to sublimation

1. Sublimation- a solid changes directly to a gas without going through the liquid stat

D. Condensation - occurs when a gas change to a liquid

ex: water vapor from showering condensin on a mirror

Jan 16-10:28 AM

II Heat and State Changes

A. Heat of fusion- the amount of energy to change a material from a solid state to a liquid

1. H_2O's heat of fusion is 334 kJ/kg

B. Heat of vaporization- the amount of energy to change a material from a liquid to a gas

1. H_2O's heat of vaporization 2260 kJ/kg

→ Figure 8-12, p. 226 for example

C. Evaporitive Cooling

1. In order for water to evaporate from your skin, energy is required

a. this energy comes from your body heat, which leaves your skin feeling cooler

b. this is the purpose of sweating

Jan 16-10:38 AM

8.2/8.3 Review

Grade: 8th

Subject: Physical Science

Date: 1/17/13

Jan 17-9:11 AM

1 Excess heat in a water system is an example of _____ pollution.

A kinetic
B potential
C thermal
D mechanical

Jan 17-9:13 AM

2 Polluted water refers to water that contains such high levels of unwanted materials that it is unacceptable for drinking or other specific purposes.

True
False

Jan 17-9:14 AM

3 The amount of energy needed to change a material from the solid state to a liquid state is known as...

A heat of vaporization
B heat of fusion
C condensation
D evaporation

Jan 17-9:16 AM

4 During evaporation, a liquid changes to a gas gradually at temperatures below the boiling point.

Jan 17-9:17 AM

5 ~~Evaporation~~ Condensation takes place when a gas changes to a liquid.

True

False

Jan 17-9:18 AM

8.4 Behavior of Gases

I. Pressure

A. The mixture of gases, that is Earth's air, or atmosphere, exerts a force called pressure

B. Pressure – the amount of force exerted per unit of area

1. Pressure = $\frac{\text{Force}}{\text{Area}}$ → $P = \frac{F}{A}$

C. Measuring Pressure

1. The Pascal (P) is the SI unit of pressure
   a. One Pascal = force of one Newton per meter squared (m^2)
   b. Pressure in kilo Pascals (kPa)

Jan 17-10:15 AM

c. At sea level, atmospheric pressure is 101.3 kPa

II Our Atmosphere - A sea of air

A. Millions of fast-moving, colliding particles create air pressure

B. Higher Altitude Mean less Pressure

1. There are fewer collisions between gas particles at higher elevations the further into the different levels in the atmosphere

III Boyle's Law

A. Boyles law - State that if you decrease the volume of a container of gas, the pressure of the gas will increase, provided temperature does not change

1. Increasing the volume of a container causes pressure to drop

Jan 17-10:25 AM

IV. Charles Law

A. Charles Law - states that the volume of a gas increases with increasing temperature, provided the pressure does not change

1. Charles used this law to calculate the temp at which a gas would have no volume (volume = 0)

a. this is known as absolute zero, -273°C or 0 Kelvin

Jan 17-10:42 AM

8.4 Review

Grade: 8th

Subject: Physical Science

Date: 1/17/13

Jan 17-9:18 AM

1 Force per unit area is a measure of _____.

pressure

Jan 17-9:19 AM

2 Average sea-level air pressure is _____ kiloPascals (kPa).

101.3

Jan 17-9:20 AM

3 With temperature held constant, when teh volume of the gas increases, the pressure will _____.

A decrease
B increase
C stay the same

Jan 17-9:21 AM

4 With pressure held constant, as a gas is heated, the volume will _____.

A decrease
B increase
C stay the same

Jan 17-9:21 AM

5 Charle's Law led to the determination that the temperature at which a gas would have a volume of zero, the temperature is _____ Kelvin (K).

Jan 17-9:23 AM

Chapter 8 Review

Grade: 8th

Subject: Physical Science

Date: 1/22/12

Jan 17-9:24 AM

1 The cause of buoyant force was first explained by Archimedes.

A Pascal
B Bernoulli
C Archimedes
D Venturi

Jan 19-5:46 PM

2 The discovery that pressure is exerted in all directions throughout a fluid was made by Pascal.

A Pascal
B Bernoulli
C Archimedes
D Venturi

Jan 19-5:47 PM

3 Hydraulic jacks that move heavy loads make use of Pascal's principle.

A Archimede's
B Pascal's
C Bernoulli's
D Venturi's

Jan 19-5:48 PM

4 According to _____ principle, as the velocity of a fluid increases, the pressure exerted by the fluid decreases.

A Archimede's
B Pascal's
C Bernoulli's
D Venturi's

Jan 19-5:49 PM

5 According to _____ principle, the buoyant force on an object in a fluid is equal to the weight of the fluid displaced by the object.

A Archimede's
B Pascal's
C Bernoulli's
D Venturi's

Jan 19-5:51 PM

6 The density of water is 1.0 g/(cm^3). How many kilograms of water does a submerged 120 -cm^3 block displace?

$1.0\ g/cm^3 \Rightarrow 1\ g/cm^3$

$1g = \frac{.001\ kg}{cm^3} = \frac{?}{120\ cm^3} = .001\ kg/cm^3$

$.001 \times 120 = .12\ kg$

Jan 19-5:53 PM

7 From the previous problem, what is the buoyant force on the block (answer in N)? Remember, one kilogram weighs 9.8 Newtons (N).

$(x)(9.8\ m/s^2) = \quad N$

$(.12)(9.8) = 1.18\ N$

Jan 19-5:55 PM

8 The temperature at which all particle motion of matter would stop is _____.

A absolute zero
B its melting point
C 0 degrees C
D 273 degree C

Jan 22-4:13 PM

9 The state of matter that has a definite volume and a definite shape is _____.

A gas
B liquid
C plasma
D solid

Jan 22-4:13 PM

10 The most common state of matter is _____.

A gas
B liquid
C plasma
D solid

Jan 22-4:14 PM

11 Most pressure is measure in _____.

A grams
B kilopascals
C newtons
D kilograms

Jan 22-4:16 PM

12 Pascal's principle is the basis for _____.

A aerodynamics
B buoyancy
C hydraulics
D changes of state

Jan 22-4:16 PM

13 Bernoulli's principle explains why _____.

A airplanes fly
B boats float
C pistons work
D ice melts

Jan 22-4:29 PM

14 Particles seperate completely from each other in a(n) _____.

A gas
B liquid
C solid
D amporphous material

Jan 22-4:30 PM

15 The state of matter in the sun and other stars is primarily _____.

A amporphous
B plasma
C liquid
D gas

Jan 22-4:31 PM

16 In general, as a solid is heated, it _____.

A becomes a gas
B condenses
C contracts
D expands

Jan 22-4:32 PM

17 Material's heat of fusion gives the amount of energy needed to _____.

A condense a gas
B boil a liquid
C melt a solid
D evaportate a liquid

Jan 22-4:33 PM

18 The volume of gas is reduced when the temperature is decreased summarizes Charles's Law

True
False

Jan 22-4:35 PM

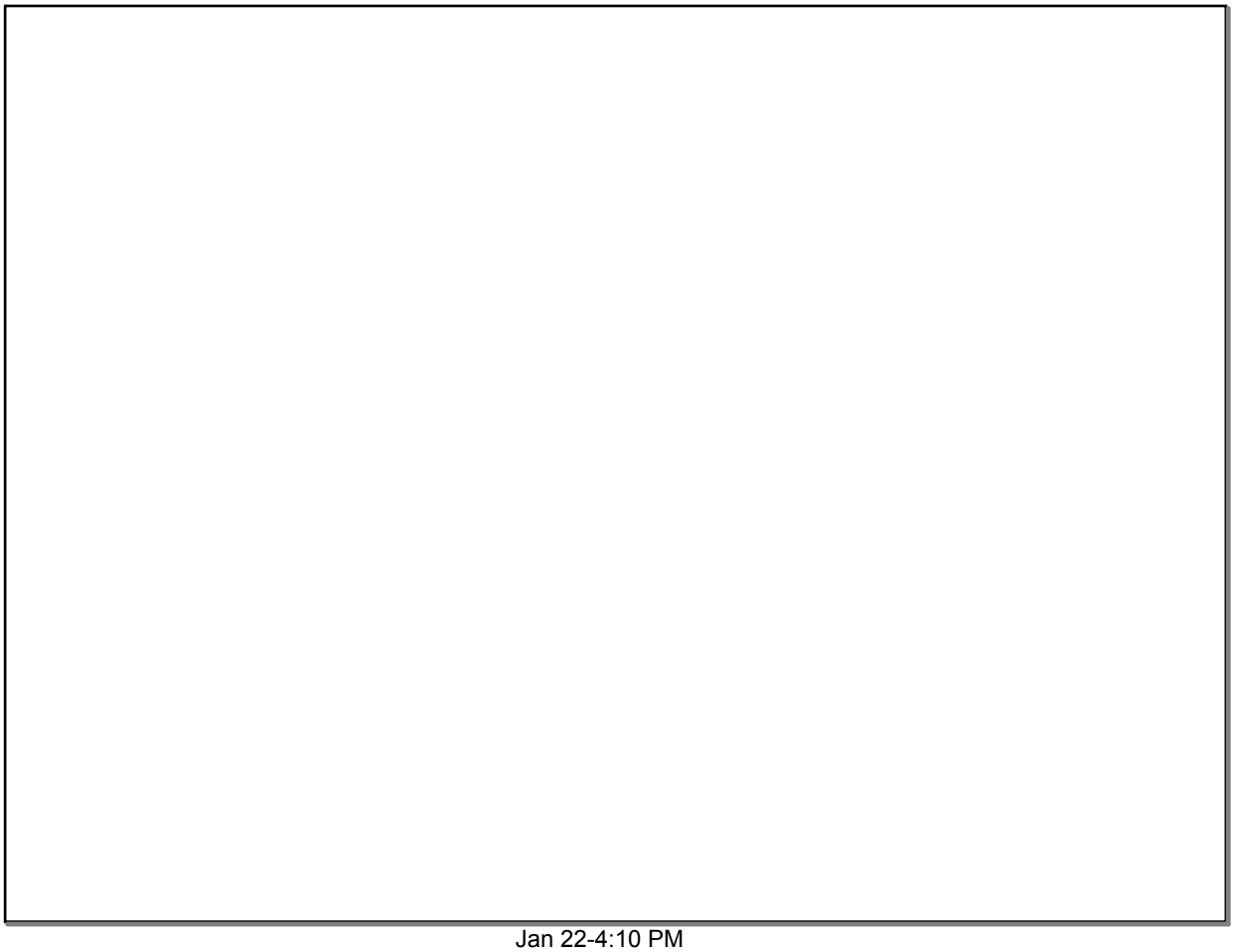
19 In a _____, particles are arranged in regular repeating patterns.

Jan 22-4:37 PM

20 The kinetic theory of matter states that matter is made of tiny, moving particles.

True
False

Jan 22-4:38 PM



Jan 22-4:10 PM